

ABSTRACT

A spin transistor comprises a spin injector for injecting, from a first nonmagnetic electrode carriers with a spin parallel to a spin band forming the band edge of a first ferromagnetic barrier layer, to a second nonmagnetic electrode layer, as hot carriers. It also comprises a spin analyzer whereby, due to spin-splitting at the band edge of a second ferromagnetic barrier layer, the spin-polarized hot carriers are transported to a third nonmagnetic electrode when the direction of the spin of the carriers injected into the second nonmagnetic electrode is parallel to that of the spin of the spin band at the band edge of the second ferromagnetic barrier layer, whereas the hot carriers are not transported to the third nonmagnetic electrode in the case of antiparallel spin. A memory element is also provided that comprises such a spin transistor.